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APPLICATION NO.	FILING DATE	FIRST NAMED INVENTOR	ATTORNEY DOCKET NO.	CONFIRMATION NO.
10/801,742	03/15/2004	Noboru Nakanishi	TI-34037.1	1818

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EXAMINER

KARIMY, MOHAMMAD TIMOR

ART UNIT	PAPER NUMBER
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2815

DATE MAILED: 07/05/2006

Please find below and/or attached an Office communication concerning this application or proceeding.

Office Action Summary	Applicant(s)	Applicant(s)	
	10/801,742	NAKANISHI, NOBORU	
	Examiner	Art Unit	
	Mohammad Timor Karimy	2815	

-- The MAILING DATE of this communication appears on the cover sheet with the correspondence address --

Period for Reply

A SHORTENED STATUTORY PERIOD FOR REPLY IS SET TO EXPIRE 3 MONTH(S) OR THIRTY (30) DAYS, WHICHEVER IS LONGER, FROM THE MAILING DATE OF THIS COMMUNICATION.

- Extensions of time may be available under the provisions of 37 CFR 1.136(a). In no event, however, may a reply be timely filed after SIX (6) MONTHS from the mailing date of this communication.
- If NO period for reply is specified above, the maximum statutory period will apply and will expire SIX (6) MONTHS from the mailing date of this communication.
- Failure to reply within the set or extended period for reply will, by statute, cause the application to become ABANDONED (35 U.S.C. § 133). Any reply received by the Office later than three months after the mailing date of this communication, even if timely filed, may reduce any earned patent term adjustment. See 37 CFR 1.704(b).

Status

- 1) ☒ Responsive to communication(s) filed on 15 March 2004.
- 2a) ☐ This action is **FINAL**. 2b) ☒ This action is non-final.
- 3) ☐ Since this application is in condition for allowance except for formal matters, prosecution as to the merits is closed in accordance with the practice under *Ex parte Quayle*, 1935 C.D. 11, 453 O.G. 213.

Disposition of Claims

- 4) ☒ Claim(s) 13-24 is/are pending in the application.
- 4a) Of the above claim(s) _____ is/are withdrawn from consideration.
- 5) ☐ Claim(s) _____ is/are allowed.
- 6) ☒ Claim(s) 13-24 is/are rejected.
- 7) ☐ Claim(s) _____ is/are objected to.
- 8) ☐ Claim(s) _____ are subject to restriction and/or election requirement.

Application Papers

- 9) ☐ The specification is objected to by the Examiner.
- 10) ☒ The drawing(s) filed on _____ is/are: a) ☒ accepted or b) ☐ objected to by the Examiner.
Applicant may not request that any objection to the drawing(s) be held in abeyance. See 37 CFR 1.85(a).
Replacement drawing sheet(s) including the correction is required if the drawing(s) is objected to. See 37 CFR 1.121(d).
- 11) ☐ The oath or declaration is objected to by the Examiner. Note the attached Office Action or form PTO-152.

Priority under 35 U.S.C. § 119

- 12) ☐ Acknowledgment is made of a claim for foreign priority under 35 U.S.C. § 119(a)-(d) or (f).
- a) ☐ All b) ☐ Some * c) ☐ None of:
1. ☐ Certified copies of the priority documents have been received.
2. ☐ Certified copies of the priority documents have been received in Application No. _____.
3. ☐ Copies of the certified copies of the priority documents have been received in this National Stage application from the International Bureau (PCT Rule 17.2(a)).
- * See the attached detailed Office action for a list of the certified copies not received.

Attachment(s)

- | | |
|---|---|
| 1) <input checked="" type="checkbox"/> Notice of References Cited (PTO-892) | 4) <input type="checkbox"/> Interview Summary (PTO-413) |
| 2) <input type="checkbox"/> Notice of Draftsperson's Patent Drawing Review (PTO-948) | Paper No(s)/Mail Date. _____ |
| 3) <input type="checkbox"/> Information Disclosure Statement(s) (PTO-1449 or PTO/SB/08) | 5) <input type="checkbox"/> Notice of Informal Patent Application (PTO-152) |
| Paper No(s)/Mail Date _____ | 6) <input type="checkbox"/> Other: _____ |

DETAILED ACTION

Claim Objections

1. Claims 14-24 are objected to because of the following informalities: In claims 14-24, line 1, "A" should be changed to "The" for clarity. Appropriate correction is required.

Claim Rejections - 35 USC § 112

2. The following is a quotation of the second paragraph of 35 U.S.C. 112:

The specification shall conclude with one or more claims particularly pointing out and distinctly claiming the subject matter which the applicant regards as his invention.

3. Claims 13, 15-18 are rejected under 35 U.S.C. 112, second paragraph, as being indefinite for failing to particularly point out and distinctly claim the subject matter which applicant regards as the invention.

In Claim 13, the limitations "said die" in line 8 and 12 and "said substrate" in lines 9-10 and 13 lack antecedent basis.

In claim 15, the limitation "the bond pads" in line 20 lacks antecedent basis.

In claim 16, the limitation "said die bond pad" and "said bump" in line 2 lack antecedent basis.

In claim 17, the limitation "the insulating layer" lacks antecedent basis.

In claims 16-20, it is unclear as to what is a relationship between each die bond pad, an insulating layer or a conductive layer and the rest of the device.

Product-by-Process Limitations

4. While not objectionable, the Office reminds Applicant that “product by process” limitations in claims drawn to structure are directed to the product, per se, no matter how actually made. *In re Hirao*, 190 USPQ 15 at 17 (footnote 3). See also, *In re Brown*, 173 USPQ 685; *In re Luck*, 177 USPQ 523; *In re Fessmann*, 180 USPQ 324; *In re Avery*, 186 USPQ 161; *In re Wethheim*, 191 USPQ 90 (209 USPQ 554 does not deal with this issue); *In re Marosi et al.*, 218 USPQ 289; and particularly *In re Thorpe*, 227 USPQ 964, all of which make it clear that it is the patentability of the final product per se which must be determined in a “product by process” claim, and not the patentability of the process, and that an old or obvious product produced by a new method is not patentable as a product, whether claimed in “product by process” claims or otherwise. Note that applicant has the burden of proof in such cases, as the above case law makes clear. Thus, no patentable weight will be given to those process steps which do not add structural limitations to the final product.

5. Insofar as definite, the claims are rejected as follows.

Claim Rejections - 35 USC § 102

6. The following is a quotation of the appropriate paragraphs of 35 U.S.C. 102 that form the basis for the rejections under this section made in this Office action:

A person shall be entitled to a patent unless –

(b) the invention was patented or described in a printed publication in this or a foreign country or in public use or on sale in this country, more than one year prior to the date of application for patent in the United States.

7. Claims 13-15 are rejected under 35 U.S.C. 102(b) as being anticipated by Bernardoni et al. (US Patent 5,278,726).

With respect to claim 13, Bernardoni et al. disclose, as shown in Figures 1-5, a semiconductor device formed by the process of:

(a) applying an electrically non-conductive material 16 covering a least a portion of **the** die and extending onto **the** substrate to a plurality of contact pads 11 formed on **the** substrate; and

(b) applying an electrically conductive material 13 over the non-conductive material and extending from an electrical point of contact of **the** die to at least one contact pad on **the** substrate.

With respect to claim 14, Bernardoni discloses in figures 1-5 the semiconductor device of claim 13, wherein the conductive material is separated into a plurality of conductive patches 13 (note element 13 in figure 3).

With respect to claim 15, Bernardoni discloses in figures 1-4 the semiconductor device of claim 13, wherein a hole is trimmed into the non-conductive material 16 over and down to the bond pads, exposing at least a portion of each bond pad to be connected.

Claim Rejections - 35 USC § 103

8. The following is a quotation of 35 U.S.C. 103(a) which forms the basis for all obviousness rejections set forth in this Office action:

(a) A patent may not be obtained though the invention is not identically disclosed or described as set forth in section 102 of this title, if the differences between the subject matter sought to be patented and the prior art are such that the subject matter as a whole would have been obvious at the time the

invention was made to a person having ordinary skill in the art to which said subject matter pertains. Patentability shall not be negated by the manner in which the invention was made.

9. Claim 15 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Ishiyama et al. (US Patent 6,225,570).

Bernardoni discloses the semiconductor device as recited in the rejection above. Bernardoni, however, does not disclose a hole is trimmed into the non-conductive material over and down to the bond pads, exposing at least a portion of each bond pad to be connected. Nonetheless, Ishiyama et al. disclose in figure 10 a hole 27 is trimmed into the non-conductive material 17. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form the non-conductive material of Bernardoni et al. having a hole being trimmed, such as taught by Ishiyama et al. because this technique is commonly used to form the hole in the non-conductive material.

10. Claim 16-18 and 21-22, insofar as in compliance with 35 USC 112, are rejected under 35 U.S.C. 103 (a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Arledge et al (US Patent 5,891,795).

With respect to claim 16, Bernardoni disclose the invention of claim 13 as recited in the rejection above, wherein an electrically conductive bump is formed on each said die bond pad; however, Bernardoni does not explicitly teach the conductive bump protrudes through the non-conductive and conductive material. Nonetheless, Arledge et al. teach in figures 1-4, wherein the conductive bump protrudes the conductive material

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6 and non-conductive material 40 in order to provide connection to an upper circuitry. In other words, the conductive bumps will function as conductive vias providing a conduction path in a multilayer circuit (see column 2 lines 15-26). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form Bernardoni's device allowing the bump protrudes through the conductive and non-conductive material as taught by Arledge. The motivation for doing so would be to provide a conduction path.

With regard to claims 17-18, Bernardoni et al. discloses the invention of claim 13 as recited in the rejection above. However, Bernardoni does not disclose an insulative layer comprising a non-conductive epoxy or a non-conductive polyimide covering the substrate. Nonetheless, Arledge et al. teach the formation of an insulating layer (40) comprising a non-conductive epoxy or a non-conductive polyimide covering a substrate 10 (see Figure 3 and column 3, lines 24-35). Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to form Bernardoni's device further including an insulating layer comprising a non-conductive epoxy or a non-conductive polyimide covering the substrate, such as taught by Arledge in order to protect the substrate from external contamination.

11. Claim 19 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Crowley et al. (US Patent 6,707,138 B2).

With respect to claim 19, Bernardoni discloses the invention of claim 13 as recited in the rejection above; however, Bernardoni does not teach the conductive layer comprising of conductive ink. Nonetheless, Crowley teaches an electrical layer comprising of conductive ink in figures 4-5 and column 4 lines 51-54 for conduction. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use conductive ink in Bernardoni's conductive layer as taught by Crowley to provide conduction.

12. Claim 20 is rejected under 35 U.S.C. 103(a) as being unpatentable over Bernardoni et al. (US Patent 5,278,726) in view of Munshi (US Patent 6,718,628 B2).

With respect to claim 20, Bernardoni discloses the invention of claim 13 as recited in the rejection above; however, Bernardoni does not teach the conductive layer comprising of metal ion coating. Nonetheless, Munshi teaches a conductive layer comprising metal ion coating in column 12 lines 16-20. Therefore, it would have been obvious to one of ordinary skill in the art at the time the invention was made to use metal ion coating in Bernardoni's conductive layer as taught by Munshi in order to provide protection from oxidation and enhance conduction.

13. With respect to claims 21-24, the limitations, (a) includes spinning the non-conductive material (claim 21), (a) includes spraying the non-conductive material (claim 22); (b) includes spinning the non-conductive material (claim 23), (b) includes spraying

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the non-conductive material (claim 24), do not structurally distinguish over the prior art (Bernardoni et al).


Conclusion

14. Any inquiry concerning this communication or earlier communications from the examiner should be directed to Mohammad Timor Karimy whose telephone number is 571-272-2006. The examiner can normally be reached on 8:30 AM - 5:00 PM.

If attempts to reach the examiner by telephone are unsuccessful, the examiner's supervisor, Ken Parker can be reached on 571-272-2298. The fax phone number for the organization where this application or proceeding is assigned is 571-273-8300.

Information regarding the status of an application may be obtained from the Patent Application Information Retrieval (PAIR) system. Status information for published applications may be obtained from either Private PAIR or Public PAIR. Status information for unpublished applications is available through Private PAIR only. For more information about the PAIR system, see <http://pair-direct.uspto.gov>. Should you have questions on access to the Private PAIR system, contact the Electronic Business Center (EBC) at 866-217-9197 (toll-free). If you would like assistance from a USPTO Customer Service Representative or access to the automated information system, call 800-786-9199 (IN USA OR CANADA) or 571-272-1000.

mtk


N. DREW RICHARDS
PRIMARY EXAMINER